A History of Chemistry.

Die geschichtliche Entwicklung der Chemie. Von Dr. Eduard Färber. Pp. xii+312+4 plates. (Berlin: Julius Springer, 1921.) U.K., 312 marks; Germany, 78 marks.

DR. EDUARD FÄRBER'S "Historical Development of Chemistry" is one of those books that owe their existence to other books. It has been put together mainly with the aid of older works, more or less authoritative, on the subject of which it treats. As one turns over its pages, it is not difficult to trace the source of most of its statements. With the possible exception of the concluding section, which is concerned with the history of the present epoch, there is little evidence of original inquiry to be seen anywhere. Kopp and Lippmann have been drawn upon freely for the story of the rise and development of the chemical arts until the inception of phlogistonism, and Hoefer and Ostwald's "Klassiker," and Ostwald's "Lehrbuch der allgemeinen Chemie" have together furnished most of the material for the story up to the Revolution accomplished by Lavoisier and his co-workers. Much relating to the subsequent period has been gleaned from Kahlbaum's "Monographien," and from Hjelte's and Graebe's admirable histories of organic chemistry. For so much of the history of the progress of chemistry during what we may term our own epoch which has not yet been included in any systematic historical work, Dr. Färber has necessarily been driven for his information to special treatises, periodicals, and the published transactions and journals of the recognised chemical societies. To this extent he has certainly striven to exercise an independent judgment.

The works the author has consulted are excellent in their several ways, but it is well known to historiographers that much additional information has come to light on subjects which seemed adequately treated when certain of these works appeared. This is especially true of the earliest periods of chemical development. The researches of Egyptologists, for example, and the recent publication of works relating to Hindu and Chinese chemistry have made known many important facts concerning primitive operative processes essentially chemical in their nature. Manuscripts relating to later times have been discovered of which the existence was unsuspected. The real nature of others already known had not been revealed or was imperfectly understood. A more critical examination of ancient treatises has afforded new interpretations of what was obscure. Kopp's "Geschichte," published in 1843, when its author was barely of age, admirable as it is in many respects, has no longer the authority it enjoyed half a century ago. The "Beiträge," which appeared between 1869 and 1875, and the two volumes on "Die Alchemie in älterer und neuerer Zeit," based upon a fuller study of certain periods, no doubt supplemented and amplified the history. The "Entwicklung der Chemie in der neueren Zeit," printed and published in 1873 under the auspices of the Historical Commission of the Bavarian Academy, is but a fragment. It was written at a time of rapid change when Kopp was nearing the allotted span, and when his association with organic chemistry, never very intimate, was but slight. His editorial connection with Liebig's *Annalen* was probably the main source of his inspiration; certainly the Heidelberg atmosphere at that period had no quickening influence. Presumably Dr. Färber has been in a position to make use of this supplementary work. In any case, what is of permanent value in it has been incorporated in such later histories as that of Ernst von Meyer and of Ladenburg, but our author makes no mention of this additional matter.

It must be admitted that much of the information needed in the preparation of a history of chemistry that will comply with modern standards of historical research is not readily accessible. Some of it is scattered through publications comparatively unknown to the average professional chemist, as they seldom find their way into the ordinary chemical library. But some of this information has appeared in book form and is easily available, as, for example, Berthelot's "Les Origines d'Alchemie" and Roscoe and Harden's "New View of the Origin of Dalton's Atomic Theory," both of which works would seem to have escaped the author's notice.

Although the work is obviously a compilation—and it is but just to the author to state that he freely acknowledges his obligations by his abundant references to the sources of his statements—we by no means would imply that it is without merit. On the contrary, the general reader who is desirous of learning something of the rise and development of chemical science will find it of great interest, and most professed chemical students would widen their horizon considerably by an attentive perusal of its contents. It is written absolutely without bias and with an evident desire to present a well-proportioned and reasonably adequate account of the rise and progress of the science over the periods which the authors to whom the writer is mainly indebted have already traversed.

Considering that the book is intended for general reading, we venture to suggest that it would have added to its attractiveness if it were more freely illustrated. The interest of history is largely personal. The ordinary reader desires to know what manner of men they were who have collected the facts

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of chemistry, and formulated its theories. He wishes to learn something of their characteristics, where and how they laboured, and what were the conditions and circumstances under which their discoveries were made. This no doubt would have involved search, wide reading, insight, and power of characterisation, but it would have added greatly to the human interest of the work, and have imparted vitality and colour to what we are constrained to say is a rather bald and impassive story of human achievement.

The author attempts in some degree to meet what we suggest by reproducing a copy of a print belonging to the National Germanic Museum at Nuremberg representing an "Alchemist's Laboratory"; by a picture of Berzelius as a rather slim young man in knee-breeches, well-developed calves, court shoes and a tight, cut-away coat, seated in a well-upholstered chair, watching, whilst reading, a highly idealised piece of distillation-apparatus, heated by a Roman lamp—a picture reproduced from No. VII. of Kahlbaum's "Monographien." When one recalls the humble kitchen in the Swedish Academy's apartments which, under the despotic sway of old Anna the cook, served the great chemist as his laboratory, this representation of the well-groomed philosopher in the perfectly-appointed parlour provokes a smile. It is pleasing, but it is not history. More realistic is Prautschold's better-known drawing of the interior of the Giessen Laboratory as it appeared in 1842. It represents a crowded assemblage of workers who resemble the German students of opera-bouffe, but it is probably characteristic. As the names of those figured are known it would have added to the interest of the picture to have given them. Some of them at least are not unknown to fame. The remaining plate is a photographic reproduction of van't Hoff's private laboratory at Amsterdam, taken from Prof. Cohen's memoir. The illustrations are probably given as types of laboratories of their respective periods, but happier selections are available and might have been introduced.

The ideal history of chemistry has yet to be written. There already exist a number of works of the character of the one now noticed, but many of them are not much above the range of ordinary school histories. The subject is worthy of a fuller treatment; its several periods should be dealt with in special monographs and in the manner of professed historians. The story during the last 70 or 80 years—infinitely the most fascinating and the most fruitful period in its history—has not yet been adequately handled. But the man who could handle it most effectively is probably too busy in augmenting it.

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Antarctic Polychæta.

Australasian Antarctic Expedition, 1911–14, under the Leadership of Sir Douglas Mawson. Scientific Reports: Series C—Zoology and Botany. Vol. 6, Part 3, Polychæta. By Dr. W. B. Benham. Pp. 128 + plates 6 + Map 1. (Sydney: Government Printing Office, 1921.) 12*s*.

The labours of Kinberg, Grube, Ehlers, Gravier, Pixell, Ramsay, Benham (1909), and others, besides those described in the *Challenger* volume, have rendered us more or less familiar with some of the Antarctic Polychæts. The present memoir of Prof. Benham, an able and experienced observer, adds notably to our knowledge of such forms as have been obtained within the half-circle round the Antarctic land. The materials on which his report is based came chiefly from Commonwealth Bay, Adelie Land (Australian Antarctic), though a few were procured off Macquarie and Maria Islands and Tasmania, the collection containing fifty-eight species, of which eleven are new. In his summary of Antarctic forms hitherto obtained the author shows that the largest number of species belong to the Terebellidæ, followed in diminishing numbers by the Syllidæ, Phyllodocidæ, Aphroditidæ, Maldanidæ, Serpulidæ, and Sabellidæ, the other families having fewer numbers. Moreover, some species occur in large numbers, such as *Thelepus antarcticus*, *Harmothœ spinosa*, and *Potamilla antarctica*, a feature not uncommon in similar species in European waters. Of his new species, perhaps the most interesting is *Amythas membranifera*, from Commonwealth Bay, an Ampharetid which has an introversible frilled membrane instead of the usual oral tentacles.

The author has extended the distribution of various known species, as well as, by the aid of well-preserved examples, added to our knowledge of their structure, sexual variations, and otherwise. Careful investigation had led Prof. Benham occasionally to differ from his predecessors, but he shows fully and fairly the grounds on which his arguments rest; *e.g.* in the distinctions between Harmothoë and Hermadion. He does not enter into the structure of the foot in diagrammatic vertical section as Mr. Southern has done in the Indian forms from the Chilka Lake, probably because such is unnecessary in the discrimination of species, though it may be useful in critical cases. The careful methods adopted by Prof. Benham enabled him, for instance, to observe the chitinous supporting rod in the long metastomial cirri of *Pelagobia vigueri* which M. Gravier had overlooked. It may be open to doubt, however, whether his new species *Sphœrodorum spissum* is not more closely connected with the European forms than is at present supposed.

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